Savage and Prescott Simulation

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Benchmark Description

May 25, 2010

Benchmark problem description.

Summary

This benchmark problem computes the viscoelastic (Maxwell) relaxation of stresses from repeated infinite, strike-slip earthquakes in 3D without gravity. The analytical solution for this problem is presented by Savage and Prescott (JGR, 1978). Although the analytical solution is for an elastic layer overlying a viscoelastic half-space assuming an infinitely long strike-slip fault, the problem can be very well approximated using a 3D finite element model. The problem is driven by a combination of constant velocities applied along the x-boundaries of the mesh, along with periodic (coseismic) fault slip applied along the upper (locked) portion of the fault and steady fault slip applied in the portion of the elastic layer below the locked section of the fault. Since the finite element solution is an approximation of a half-space solution, the mesh dimensions are somewhat arbitrary. The dimensions listed below, however, have been shown to provide a good fit to the analytical solution.

Problem Specification

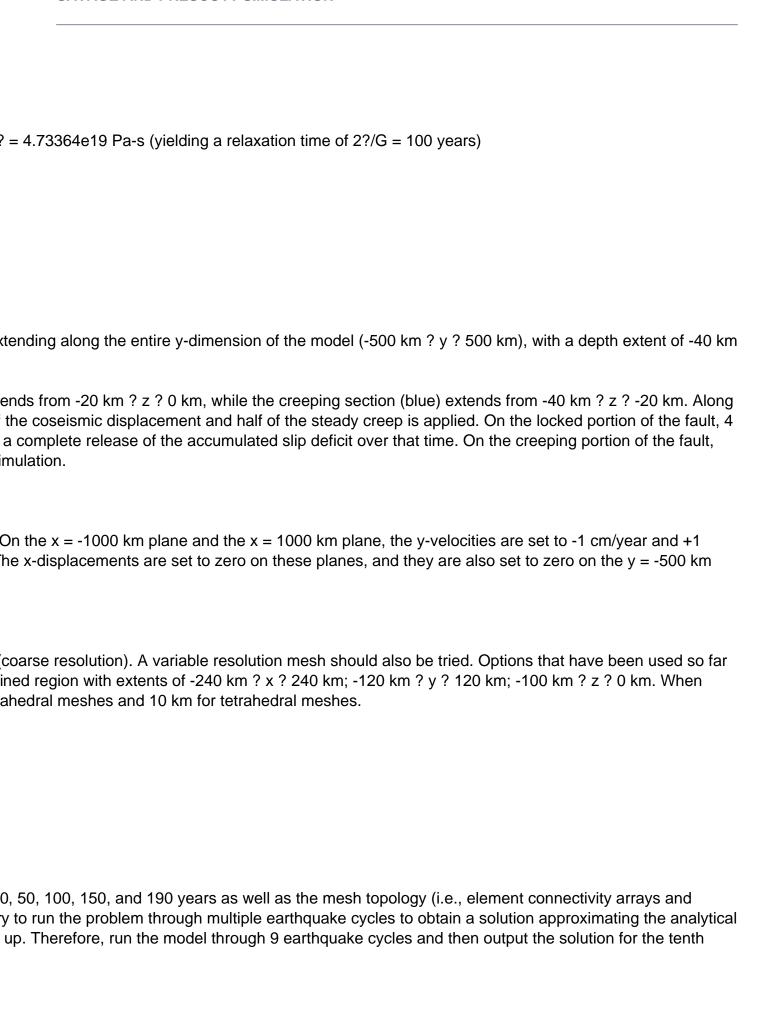
PROBLEM GEOMETRY 3D

- Model size
 - -1000 km ? x ? 1000 km
 - -500 km ? y ? 500 km
 - -400 km ? z ? 0 km
 - Top layer (elastic): -40 km ? z ? 0 km
 - Bottom layer (viscoelastic): -400 km ? z ? -40 km

TIES

whereas the bottom layer is viscoelastic.

on solid, G = 30 GPa



ng HDF5 files.	
vage and Prescott (JGR, 1978). A Python utility to compute this solution is available in the input files, along with additional utilities and figures comparing analytical results with results u	ısing
enchmarks/trunk/quasistatic/sceccrustdeform/savageprescott	